Montana Fish, Wildlife & Parks

1400 South 19th Avenue, Bozeman MT, 59718

Draft Environmental Assessment

Westslope Cutthroat Trout Restoration in two small streams In the Big Hole River Drainage

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: The proposed action would restore native westslope cutthroat trout (WCT) in the North Fork of Doolittle Creek and Sixmile Creek. Barriers precluding upstream fish movement have already been constructed or are proposed herein. Brook trout present in the streams upstream of the fish barriers are proposed for removal using the piscicide rotenone in the formulation of CFT Legumine (5% rotenone). The non-hybridized WCT present in the North Fork Doolittle and Sixmile Creek would be captured using electrofishing prior to fish removal, held in non-treated waters, and used to repopulate their respective streams following brook trout removal. Fish from non-hybridized populations may be used to repopulate these streams if westslope cutthroat trout are at very low density (Sixmile Creek). Tailed frog tadpoles would be captured and salvaged from the streams prior to treatment and released back to the streams after brook trout are removed.

B. Agency Authority for the Proposed Action:

87-1-702. Powers of department relating to fish restoration and management. The department is hereby authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects as defined and authorized by the act of Congress, provided every project initiated under the provisions of the act shall be under the supervision of the department, and no laws or rules or regulations shall be passed, made, or established relating to said fish restoration and management projects except they be in conformity with the laws of the state of Montana or rules promulgated by the department, and the title to all lands acquired or projects created from lands purchased or acquired by deed or gift shall vest in, be, there remain in the state of Montana and shall be operated and maintained by it in accordance with the laws of the state of Montana. The department shall have no power to accept benefits unless the fish restoration and management projects created or established shall wholly and permanently belong to the State of Montana, except as hereinafter provided.

C. Estimated Commencement Date:

- Barrier Construction on Sixmile Creek: Summer 2012 (pending funding)

- Fish removal in both streams: Mid July to early September 2012 or 2013
- Release of salvaged WCT and tailed frog tadpoles immediately following brook trout removal
- Potential second removal if necessary in 2013 or 2014

D. Name and Location of the Project: Westslope cutthroat trout restoration in two small streams in the Big Hole River drainage.

North Fork of Doolittle Creek is located in Beaverhead County approximately 10 miles northeast of the town of Wisdom, Montana: T1S, R13W Sec 28, 27, 34, 35. Sixmile Creek is located on the Mount Haggin Wildlife Management Area in Deerlodge County: T3N R12W Sec1, 12, 13, 24.

E. Project Size (acres affected)

1. Developed/residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian –Stream miles included in the proposed action include approximately 3 miles of the North Fork Doolittle Creek and 3 miles of Sixmile Creek for a total of roughly 6 miles.
5. Floodplain – 0 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres
9. Rangeland – 0 acres

F. Narrative Summary of the Proposed Action and Purpose of the Proposed Action

Cutthroat trout is Montana's state fish. Westslope cutthroat trout *Oncorhynchus larkia lewisi* (WCT) were first described by the Lewis and Clark Expedition in 1805 near Great Falls, Montana, and are recognized as one of 14 interior subspecies of cutthroat trout. The historical range of WCT includes Idaho, Montana, Washington, Wyoming, and Alberta, Canada. In Montana, WCT occupy the Upper Missouri and Saskatchewan River drainages east of the Continental Divide, and the Upper Columbia Basin west of the Divide. Although still widespread, WCT distribution and abundance in Montana has declined significantly in the past 100 years due to a variety of causes including introductions of nonnative fish, habitat degradation, and over-exploitation (Hanzel 1959, Liknes 1984, McIntyre and Rieman 1995, Shepard et al. 1997, Shepard et al. 2003). Reduced distribution of WCT is particularly evident in the Missouri River drainage where genetically unaltered WCT are estimated to persist in less than 5% of the habitat they once occupied, and most remaining populations are restricted to isolated headwater habitats (Shepard et al. 2003; Shepard et al. 2005). Further, many of these remaining populations are at risk of extinction due to small population size and the threats of competition, predation, and hybridization with non-native trout species.

The declining status of WCT has lead to its designation as a *Species of Special Concern* by the State of Montana, a *Sensitive Species* by the U.S. Forest Service (USFS), and a *Special Status*

Species by the Bureau of Land Management (BLM). A petition was submitted to the U.S. Fish and Wildlife Service (USFWS) to list WCT as "threatened" under the *Endangered Species Act* (ESA). USFWS status reviews have found that WCT are "not warranted" for ESA listing (DOI 2003); however, this finding was in litigation until 2008, and additional efforts to list WCT under ESA are possible.

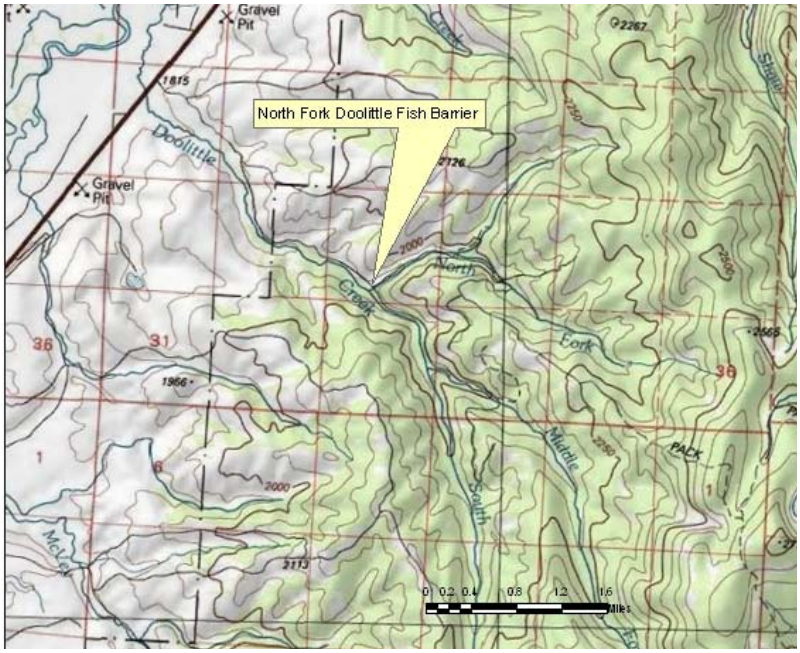
In an effort to advance range-wide WCT conservation efforts in Montana, a Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was developed in 1999 by several federal and state resource agencies (including the BLM, Montana Fish, Wildlife & Parks [FWP], the USFS, and Yellowstone National Park [YNP]), non-governmental conservation and industry organizations, tribes, resource users, and private landowners (FWP 1999: MOU). The MOU outlined goals and objectives for WCT conservation in Montana which if met would significantly reduce the need for special status designations and listing of WCT under the ESA. The MOU was revised and endorsed by signatories in 2007 (FWP 2007). As outlined in these MOU's, *the primary management goal for WCT in Montana is to ensure the long-term self-sustaining persistence of the subspecies in its historical range*. This goal can be achieved by maintaining, protecting, and enhancing all designated WCT "conservation" populations, and by reintroducing WCT to habitats where they have been extirpated.

There are a total of 47 remaining populations of WCT in the Big Hole drainage. Of the 47, at least 39 are considered "at risk" (an additional 5 have unknown population status). An "at risk" population is one that is not likely to persist over the long-term because of poor habitat, small population size, and/or the presence of non-native species. A protected population is one that is isolated from non-native species but is threatened because of small population size and/or limited habitat and the possibility of stochastic events such as fire or flood causing extinction. There are four WCT populations in the Big Hole considered protected, but they are at risk of extinction from catastrophic events (e.g. fire, drought) and may eventually suffer negative consequences of genetic inbreeding (Wang et al. 2002). A secure population is one that is isolated from the threats of non-native species and occupies adequate habitat at a high enough density to have a high probability of persisting through time. Hilderbrand and Kershner (2000) recommended a 2,500 fish minimum WCT population size for long-term persistence (>100 years). Harig and Fausch (2002) recommended the minimum amount of occupied habitat per population is 5.6 square miles (minimum watershed size) for increased likelihood of success of translocation projects. Only one population of WCT in the Big Hole drainage meets these minimum criteria for increased likelihood of long-term presentence. The other 46 remaining populations, including those whose status is unknown, are at risk. These rare local populations maintain the remaining genetic diversity of the species, and each may perpetuate adaptive traits that are important to the species as whole (Leary et al. 1998). Data collected from streams in the Big Hole drainage over the past four years indicate that many of the WCT populations in the drainage have dramatically declined or have been completely extirpated in the past ten years (Olsen 2010). If actions are not taken to conserve the fish species in the Big Hole, more populations will be lost. Projects which restore WCT are necessary to ensure the continued survival of the species in the Big Hole drainage and elsewhere. Efforts to stabilize and increase WCT populations additionally will help prevent future listing of WCT under the Endangered Species Act.

The goal of the proposed projects is to secure existing populations of non-hybridized WCT in Doolittle Creek and Sixmile Creek and potentially introduce additional cutthroat trout into Sixmile Creek. These actions are proposed to be completed in three stages: 1) salvage of remaining WCT and other native species present in the streams, 2) removal of brook trout from the stream using the piscicide rotenone in the formulation of CFT Legumine, and 3) restocking the salvaged fish into the streams and/or importing non-hybridized WCT to the streams from sources within the Big Hole drainage. Additional information about each stream is given below followed by a more detailed explanation of brook trout removal.

North Fork Doolittle Creek

Doolittle Creek is a tributary to the Big Hole River with its origins in the West Pioneer Mountains northeast of Wisdom (Figure 1). The North Fork is a small tributary that enters the mainstem approximately 1 mile upstream of the National Forest Boundary (Map 1). WCT genetic tests from the North Fork and South Fork of Doolittle Creek in 1990 indicate the fish are non-hybridized, but the density of WCT in the streams was very low. Non-native brook trout are abundant in the North Fork of Doolittle Creek and have been found to greatly outnumber WCT. Brook trout displacement of WCT is common where the species overlap and is recognized as an important reason for the loss of many WCT populations. This displacement has been attributed to a size and competitive advantage young brook trout have due to timing of reproduction (Shepard and Nelson 2004). Brook trout displacement of WCT appears to be occurring in Doolittle Creek and the North Fork. Without efforts to remove brook trout, it is probable that over a short time period (i.e., < 10 years) WCT will be completely displaced by brook trout in the Doolittle Creek drainage.



Map 1. Doolittle Creek showing the North Fork Doolittle.

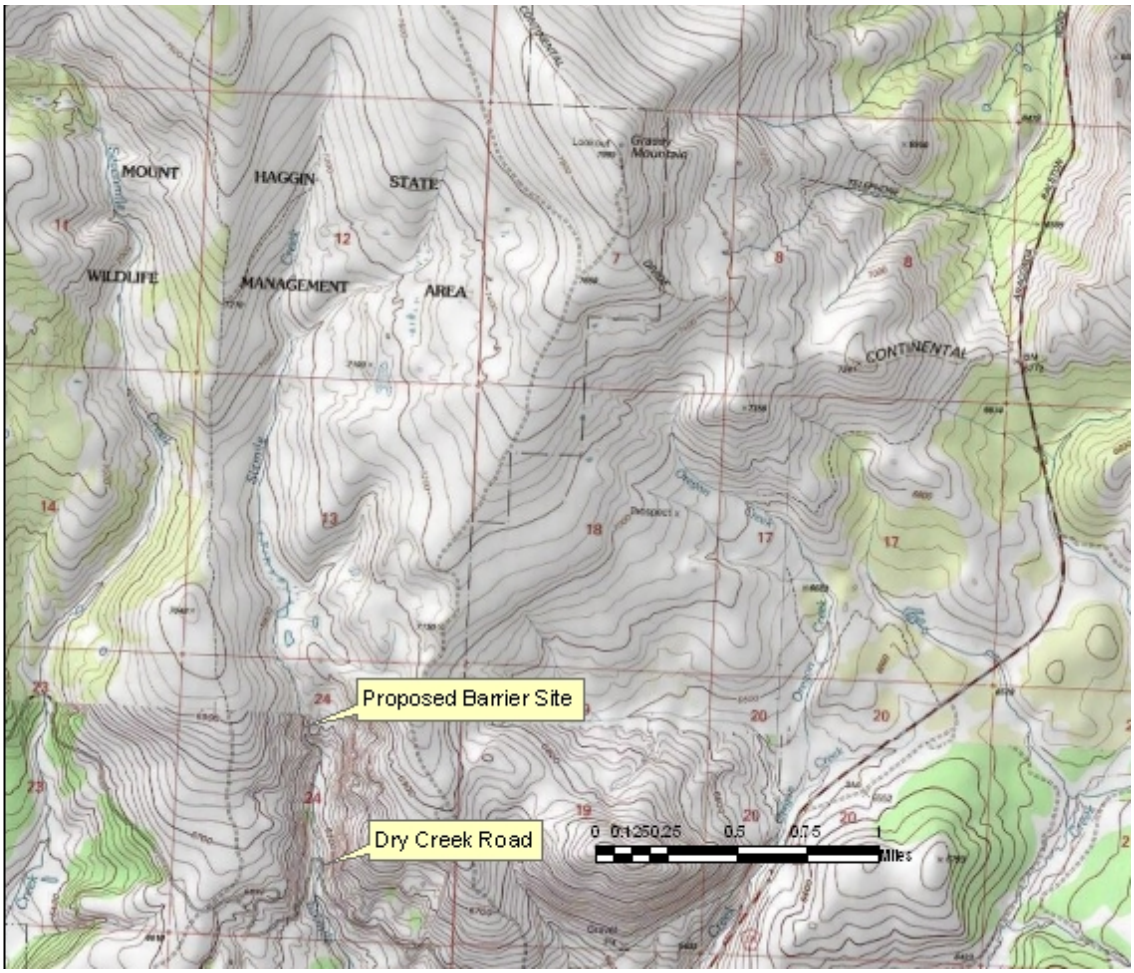
In 2011, a fish migration barrier was constructed in the North Fork of Doolittle Creek at the Forest Service Road 2421 crossing. The outlet of the North Fork Culvert was modified to create a 30 inch drop onto a concrete apron (Figure 1). The barrier is currently being evaluated to determine if it is an impediment to fish passage. Brook trout from upstream of the culvert in the North Fork have been captured using electrofishing, transported downstream of the culvert, given a permanent fin clip, and released. Subsequent electrofishing upstream of the culvert prior to the proposed treatment will determine if any of the fish released downstream were able to migrate upstream through the culvert. If the barrier impedes upstream passage, WCT restoration would proceed. If the barrier is not an impediment to fish passage, restoration would be delayed until a barrier is present. WCT restoration in the North Fork would include capture and salvage of remaining WCT and native mottled sculpin in the stream through electrofishing. Captured fish would be held in cages in Doolittle Creek upstream of the confluence of the North Fork. As many brook trout as possible in the North Fork of Doolittle Creek would also be salvaged and released downstream of the fish barrier during these efforts. Remaining brook trout would be removed using rotenone in the formulation of CFT Legumine (specifics of rotenone and treatment are given below). The CFT Legumine would be neutralized using potassium permanganate immediately downstream of the fish barrier such that fish in Doolittle Creek would not be affected by removal of brook trout in

Figure 1. Fish barrier constructed at the Forest Service Road Crossing on the North Fork of Doolittle Creek

the North Fork. It is anticipated that the treatment of the North Fork of Doolittle Creek would take 2 days and salvaged WCT and sculpin could be reintroduced to the stream shortly thereafter. Remaining WCT in the mainstem, Middle Fork and South Fork of Doolittle Creek may also be introduced into the North Fork following removal of brook trout.

Sixmile Creek

Sixmile Creek is a tributary to California Creek (Map 2). The entire drainage is located within the Mount Haggin Wildlife Management Area southwest of Anaconda. The stream is moderate gradient with a narrow riparian area near the confluence with California Creek. Upstream from the confluence approximately 1.2 miles, the stream flows through a short bedrock canyon reach with several bedrock cascades (Figure 2). Upstream of the bedrock canyon, the stream is low gradient and meandering, flowing through a willowed meadow. Evidence of historic beaver activity is present in the meadow reach, but there is no evidence of current beaver use. Upstream of the meadow, the stream forks into two major tributaries that flow through dense lodgepole pine forests. A fisheries survey was conducted in the lower reaches of the stream in 1980, and at that time brook trout dominated the fishery but rainbow and cutthroat trout were also present (Oswald 1981). Impacts from livestock grazing were also noted at the site surveyed as well as impacts from diversions for mining and irrigation. Fisheries surveys conducted in 2010 and 2011 indicate that downstream of the bedrock canyon reach only brook trout, mottled sculpin, and rainbow trout are present. Upstream of the canyon, brook trout were the only fish captured in 2010 but additional sampling in 2011 found a single WCT. Extensive sampling of the stream occurred in 2011 following the discovery of WCT, but no additional WCT were captured in the drainage; however tailed frog tadpoles were found. The stream habitat upstream of the bedrock canyon in Sixmile Creek is in excellent condition and supports a very high density of brook trout (2,500 fish/mile).



Map 2. Sixmile Creek drainage on the Mount Haggin Wildlife Management Area.

It is unknown if brook trout were introduced to the Sixmile Creek upstream of the fish bedrock canyon (no stocking record exists for the stream) or if they colonized the stream naturally. It is possible that fish passage is present in the canyon, therefore a fish barrier would need to be constructed before WCT restoration could take place. To construct a fish barrier, FWP proposes that the most downstream bedrock falls shown in Figure 4 (the photo in the upper left) be drilled and blasted to form a vertical waterfall approximately 6-8 ft in height. A small bedrock cascade immediately downstream of the falls shown in Figure 4 would be removed via blasting to increase the height of the existing falls from approximately 3 ft to 6 ft. The stream upstream would be restored to WCT once a fish barrier is in place by attempting to capture and salvage any remaining WCT and tailed frog tadpoles, and removing brook trout with rotenone in the formulation of CFT Legumine. The CFT Legumine would be detoxified downstream of the fish barrier with potassium permanganate. The stream would be restocked with salvaged fish from Sixmile Creek and/or fish from non-hybridized sources from within the Big Hole drainage. Possible nearby sources include Corral Creek, Twelvemile Creek, and Bear Creek. Salvaged tailed frog tadpoles would also be released back to the stream.

Figure 4. Series of falls on Sixmile Creek, starting from upper left: the lowermost, middle two, and upper falls. Dip net shown is 5 ft tall.

Review of Rotenone in the Formulation of CFT Legumine

Rotenone is a commonly used piscicide that is highly targeted at fish and has no impact on other terrestrial plants and animals and few impacts to non-target aquatic life at fish killing concentrations. FWP has a long history of using rotenone to manage fish populations in Montana that span as far back as 1948. The department has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation. Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s. Rotenone has also been used as

a natural insecticide for gardening and to control parasites such as lice on domestic livestock (Ling 2002).

Rotenone acts by inhibiting oxygen transfer at the cellular level. It is especially effective at low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals, birds, and other non-gill breathing organisms do not have this rapid absorption route into the bloodstream. The most common route of exposure to non-gill breathing animals is through ingestion. Rotenone is readily broken down by digestive processes and is not well absorbed through the digestive system, thus terrestrial animals can tolerate exposure to concentrations much higher than those used to kill fish.

The label requirements for product concentration in streams is 1 part CFT Legumine (5% rotenone) to 1 million parts water (1ppm). Spring areas may also be treated with the powder formulation of rotenone *(*Prentox, 7% rotenone) or a sand/powder mix to prevent fish from seeking these areas as freshwater refuges during the application. The proposed streams would be treated using drip stations which are containers that administer diluted CFT Legumine to the stream at a constant rate. These drip stations would administer Legumine to the stream at a rate of 1 ppm for 4 hours. Additionally, backwaters, spring areas, and small tributaries would be treated with backpack sprayers according to the CFT Legumine label specifications. The total amount of Legumine to be applied to each stream is unknown because the amount is dependent on the flow rate of the stream and the distance downstream the chemical would remain active (determined by on-site bioassay at the time of the treatment). One point two liters of CFT Legumine would be required to treat the entire 1.5 miles of stream, assuming a typical creek is flowing 1.5 cfs and there is 1.5 miles of stream within the treatment area and the chemical remains active for 0.75 miles (i.e., 0.75 mile spacing between application points). It is expected that fish killing concentrations of Legumine would be present in the streams for only 24-48 hours after application after which time the Legumine would have naturally detoxified and diluted to below fish killing concentrations.

To prevent the CFT Legumine from traveling downstream of the proposed treatment area, potassium permanganate would be used to neutralize any rotenone remaining in the stream at the fish barrier site (see Comment 2a below, p 21). The CFT Legumine label states that a minimum of 20-30 minutes of contact time between rotenone treated waters and the applied neutralizing agent (potassium permanganate) is necessary to fully detoxify the rotenone. A detoxification zone would be established because the rotenone is not instantly detoxified downstream of the barrier site. The detoxification zone is defined as the distance the stream travels in 20-30 minutes downstream of the fish barrier as determined by a stream dye test (in the proposed streams likely less than ¼ mile). Potassium permanganate is readily oxidized by natural processes in the stream, therefore it is imperative that adequate permanganate be applied to the stream to still be present and active at 15-30 minutes of travel time downstream. The determination of the appropriate amount of permanganate to fully neutralize any remaining rotenone is derived by an on-site testing. Stream discharge would be measured prior to detoxification, and the potassium permanganate would be applied at the rate specified on the Legumine label (3-5 ppm) and according to the on-site testing results. Neutralization would commence according the FWP Rotenone Detoxification Policy which states that detoxification with potassium permanganate will begin no less than 2 hours before the theoretical arrival time

of treated waters at the detoxification station. A chlorine meter would be used at the end of the detoxification zone to ensure adequate oxidation potential (0.5-1.0 ppm $KMnO_4$) is present after 30 min of contact time to completely neutralize the rotenone. In addition to direct measurement of the oxidation potential of the water, caged fish (westslope cutthroat trout from the Anaconda Hatchery, or brook trout captured in individual streams) would be placed in the stream to monitor the effectiveness of the detoxification station during the treatment. Distress or the lack thereof in these caged fish indicates whether or not the detoxification station is effectively neutralizing the CFT Legumine. The survival of caged fish placed in the creek immediately upstream of the detoxification station indicate when rotenone is no longer present in the stream and when detoxification is no longer required. The label states that if sentinel fish in treated stream water show no signs of distress within 4 hours, the stream water is considered no longer toxic and detoxification can be discontinued. Neutralization would continue until the theoretical time in which all treated waters have passed the fish barrier and when sentinel fish can survive for an additional 4 hours. It is anticipated that this would occur in the proposed streams within 24-48 hours after rotenone application.

Dead fish resulting from the treatment with CFT Legumine in the stream would be left on-site in the water. Studies in Washington State indicate that approximately 70% of rotenone-killed fish sink and do not float (Bradbury 1986) and decompose within a week or two. Dead fish stimulate plankton and other invertebrate growth and aid in invertebrate recovery following treatment.

It may be necessary to implement a second treatment the following year to achieve the desired objectives of complete removal of non-native fish in the event that all the brook trout are not removed during the first treatment on each stream. To determine if complete fish removal has been achieved, streams would be electrofished the spring and summer following treatment. A second treatment would be proposed for the following year if the objectives of the project were not met and non-native fish were found in the streams. Landowners, stakeholders, and other interested parties would be notified as soon as possible and a supplemental analysis to this EA would be prepared in the event that an additional treatment is necessary.

Public access would be closed during treatment to keep the public from being exposed to CFT Legumine treated waters. Public roads would be posted closed and signed during the stream treatments. Other access points (i.e., trailheads) would also be signed. Additional signs would be placed at stream crossings informing the public of the presence of treated waters and to keep out.

Funding

Funding for barrier construction on Sixmile Creek is expected to come primarily from the FWP Future Fisheries Improvement Program and local sporting and conservation groups. Other project expenses listed below would be covered under standard FWP and US Forest Service budgets including license dollar only budgets for the application of rotenone. Supplies and material including CFT Legumine have already been purchased under other projects, and no additional funding will be necessary. Expected expenses are reviewed in Table 2. This table does not include personnel expenses. Funding for construction of the fish barrier on Sixmile

Creek has not been secured, and it is possible that a lack of funds could delay the commencement of the project until 2013.

Table 2. Projected expenses for the proposed westslope cutthroat trout restoration projects.

Expenses	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST
Barrier Construction				
Equipment	1	1	$1,100.00	$1,100.00
Labor	1	1	$1,150.00	$1,150.00
Materials (explosives etc.)				
	1	Approx 5 gal CFT Legumine	$400.00	$400.00
Brook trout removal (all streams combined)				
		Project Total		$2,650.00

PART II. ALTERNATIVES

Alternative 1 – No action

The no action alternative would allow status quo management to continue. Brook trout fisheries in both streams would remain the same or could potentially expand. The "No Action" alternative would not fulfill the State's obligation to protect all genetically pure WCT populations (FWP 2007). WCT in Doolittle Creek and Sixmile Creek would continue to be threatened by competition and predation from brook trout. It is likely that WCT in both streams, including the North Fork, would be extirpated within the next 10 years if conservation actions are not taken. Also, if no action is taken in Sixmile Creek an opportunity to replicate individual or multiple populations in habitat formerly occupied by WCT would be lost. It is very difficult to conserve some populations of WCT in their native habitat because of the lack of suitable locations to establish fish migration barriers. Population replication (i.e., moving fish to another fishless stream with suitable habitat) may be the only means of making sure a particular population is not extirpated. The loss of native fish populations would be a large set-back for WCT conservation. Although the 'no action" alternative would not accomplish the goals of WCT conservation, it would not have the potential negative impacts of the proposed action such as temporary impacts to non-target aquatic invertebrates and to juvenile stages of tailed frogs.

Alternative 2 - Proposed Action: Restoration of westslope cutthroat trout in North Fork Doolittle and Sixmile creeks through the construction of a fish migration barrier, salvage of the existing WCT, removal of brook trout using rotenone in the formulation of CFT Legumine and releasing salvaged fish back into the streams or importing non-hybridized WCT from other sources within the Big Hole drainage.

This alternative would involve constructing a fish migration barrier in Sixmile Creek. In both streams proposed for restoration, brook trout would be removed from the streams upstream of

fish barriers. The piscicide proposed for brook trout removal would be rotenone in the formulation of CFT Legumine (5% rotenone). The rotenone would be detoxified within ¼ mile downstream of the fish migration barriers using potassium permanganate to prevent impacts to non-target areas. WCT and other native species would be salvaged from the stream and held in a secure location prior to fish removal. Salvaged fish and other species would be released back into the streams or non-hybridized WCT would be imported from other sources once fish removal is achieved and rotenone is no longer present in the streams. This alternative offers the highest probability of achieving the goal of conserving the WCT populations identified. Successful completion of the proposed action would result in approximately 6 miles of habitat that would be secured for WCT in the Big Hole drainage. Once the populations are secure, they could further serve as egg donor sources for westslope cutthroat trout restoration in other streams.

Alternative 3 – Construct a fish migration barrier and mechanically remove brook trout from the North Fork of Doolittle and Sixmile creeks.

This alternative would involve construction of a fish migration barrier in Sixmile Creek, identical to Alternative 2 (preferred alternative), but electrofishing would be used rather than rotenone to remove brook trout. Multiple-pass electrofishing has been used to eradicate nonnative trout from several small streams in north central Montana (Big Coulee, Middle Fork Little Belt, and Cottonwood creeks) and in south west Montana (Muskrat, Whites, and Staubach creeks). Electrofishing can be an effective means of capturing fish in streams. However, electrofishing has limitations. Generally, it is only 50 -70% efficient at capturing fish depending on the type of habitat and fish size distribution. Electrofishing is inefficient at capturing juvenile fish, and generally electrofishing removal efforts require multiple years to allow juvenile fish to grow to the size where they can be captured. Electrofishing is also very labor intensive. The project reaches where electrofishing removals have been successful were generally less than 3 miles in length and required up to 25 electrofishing removal passes over several years to eradicate the unwanted species. Each electrofishing pass generally requires a crew of 3 to 9 people. Eradication of brook trout from the proposed streams with electrofishing would be difficult because of the length of stream involved (6 miles total), the high density of brook trout, and the complexity of the habitat. For example, electrofishing removal efforts in McVey Creek near the town of Wisdom in the early 1990's and from 2005-2007 were not successful at achieving a significant reduction in brook trout numbers in the stream. It would require a 4-5 year commitment to removals with 3-4 crews (6-12 people) for a minimum of 2-4 weeks each year to achieve complete removal of brook trout from the North Fork Doolittle and Sixmile creeks via electrofishing. Such an effort would be impractical and cost prohibitive. It is also unclear whether 100% removal of brook trout could be achieved given the length of the stream and the complexity of the habitat. For these reasons, this alternative was eliminated from further consideration. Alternative 3, while less likely to accomplish the goals of WCT conservation in Sixmile and North Fork Doolittle creeks, would not have the potential negative impacts of the proposed action such as temporary impacts to non-target aquatic invertebrates and to juvenile tailed frogs.

Alternative 4: Construct a fish migration barrier and use angling to eliminate brook trout from the North Fork of Doolittle and Sixmile creeks.

FWP has the authority under commission rule to modify angling regulations for the purpose of removing unwanted fish from a lake or stream. Unfortunately, this method would not likely result in complete fish removal or even brook trout suppression for a number of reasons, mostly because the proposed streams are small and likely currently receive little or no fishing pressure. Attracting anglers to the streams to harvest brook trout would be very difficult because of the remoteness of the sites, small size of the streams, and small size of fish. Recreational angling has been shown to reduce the average size of fish and reduce population abundance, but rarely if ever has it been solely responsible for eliminating a fish population. Using angling techniques alone in the stream would not result in removal of brook trout and would not achieve the objective of conserving cutthroat trout. For these reasons, this method of fish removal was considered unreliable at achieving the objective of complete fish removal and was eliminated from further analysis.

PART III. ENVIRONMENTAL REVIEW

A. PHYSICAL ENVIRONMENT

1. LAND RESOURCES **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?			X		Yes	1b
c. Destruction, covering or modification of any unique geologic or physical features?			X		Yes	1c
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

Comment 1b. Some minor soil disturbance is expected in the creation of the fish barrier on Sixmile Creek. Very little soil disturbance is anticipated, however, since the barrier would be created in a bedrock dominated section of the stream.

Comment 1c. Modification of an existing bedrock cascade feature in Sixmile Creek to form a small waterfall is proposed under the preferred alternative. This would represent a change in a somewhat unique feature (bedrock canyon) of this stream. The site should only be minimally

changed, however, because drilling and blasting would be used rather than constructing a structure of foreign materials, such as concrete. Also, changes to the unique character of the canyon can be mitigated by not importing any material to the site, and it would likely be difficult to distinguish the work area from other non-impacted reaches of the canyon. It should be noted that the canyon area on Sixmile Creek is not a well known feature that is regularly visited by the public.

Cumulative Impacts: The proposed action would have short term and only minor impacts on land resources in the two drainages proposed for WCT restoration. The construction of a fish barrier in Sixmile Creek would not have any cumulative impacts on land resources. Sixmile Creek has recovered substantially from past grazing and mining impacts, and the barrier construction would not negatively affect the recovery of these areas. Any impacts to land resources would attenuate through time and would not impact the productivity of terrestrial or aquatic resources. FWP does not expect the proposed action to result in other actions that would create cumulative impacts to land resources in any of the streams proposed for WCT restoration, nor does FWP foresee any other activities in the basin that would add to impacts of the proposed action. There would not likely be increases in recreation at any of the proposed stream as a result of WCT introduction which could impact land resource. As such there are no cumulative impacts to land resources related to treatment of the North Fork Doolittle and Sixmile creeks with CFT Legumine and the construction of the fish barrier.

2. WATER Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?			X		Yes	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of flood water or other flows?		X				
d. Changes in the amount of surface water in any water body or creation of a new water body?		X				
e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				2f
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?			X		Yes	2a,f
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?			X		Yes	2j
k. Effects on other users as a result of any alteration in surface or groundwater quantity?			X		Yes	2k
l. Will the project affect a designated floodplain?		X				
m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			X		Yes	2m

Comment 2a: The proposed project is designed to intentionally introduce a pesticide to surface water to remove brook trout. The impacts would be short term and minor. CFT Legumine (5% rotenone) is an EPA registered pesticide and is safe to use for removal of unwanted fish when handled and applied according to the product label. The concentration of rotenone proposed for use is 1 part formulation to one million parts of water (ppm).

A detoxification station would be established immediately downstream of the fish barrier in order to reduce the impact of the piscicide on water quality. There are three ways in which rotenone can be detoxified once applied. The most common method is to allow natural

breakdown to occur. Rotenone is a compound that is susceptible to natural breakdown (detoxification) through a variety of mechanisms such as water chemistry, water temperature, exposure to organic substances, exposure to air, and sunlight intensity (Ware 2002; ODFW 2002; Loeb and Engsrtom-Heg 1970; Engstrom-Heg 1972; Gilderhus et al. 1986). Rotenone persistence studies by Gilderhus et al. (1986) and Dawson et al. (1991) found that in cool water temperatures of 32 to 46^{o}F the half-life ranged from 3.5 to 5.2 days. Gilderhus et al. (1986) reported that 30% mortality was experienced in rainbow trout exposed to degrading concentrations of actual rotenone (0.004 ppm) in 46^{o}F pond water 14 days after a treatment. By day 18, the concentrations were sub-lethal to trout. The second method for detoxification involves basic dilution by fresh water. This may be accomplished by fresh ground water or surface water flowing into a lake or stream. The final method of detoxification involves the application of an oxidizing agent like potassium permanganate. This dry crystalline substance is mixed with stream or lake water to produce a concentration of liquid sufficient to detoxify the rotenone. Detoxification is accomplished after about 15-30 minutes of exposure time between the two compounds (Prentiss Inc. 1998, 2007). We expect the stream would naturally detoxify down to the fish migration barrier within 24-48 hr after application of CFT Legumine because of natural breakdown processes and dilution from freshwater sources. At the fish barrier, potassium permanganate would be used to detoxify any remaining rotenone present in the stream and prevent fish killing concentrations of rotenone from traveling more than ¼ mile downstream.

Dead fish would result from this project. Bradbury (1986) reported that 9 of 11 water bodies in Washington treated with rotenone experienced an algae bloom shortly after treatment. This is attributed to the input of phosphorus to the water from decaying fish. Bradbury further notes that approximately 70% of the phosphorus content of the fish stock would be released into the water through bacterial decay. This action may be beneficial because it would stimulate algae production and would start the stream toward production of food for fish. Any changes or impacts to water quality resulting from decaying fish would be short term and minor.
Blasting in Sixmile Creek would likely create a minor amount of turbidity. Most sediment generated from blasting would likely be larger particles that would not become suspended in the stream and cause turbidity. A 318 permit from MT DEQ would be obtained prior to construction activities in Sixmile Creek.

The use of nitrogen based explosives in and adjacent to Sixmile Creek would likely temporarily increase nitrogen levels in the stream. Nitrogen is an important nutrient often linked to stream productivity. Nitrogen in nitrogen-deficient streams (although not tested, it is possible Sixmile Creek is nitrogen deficient) is rapidly absorbed by primary producers. The effects of a temporary increase in nitrogen in the stream would potentially result in increased algae production in the stream immediately downstream of the project site. These impacts are expected to be minimal because of the small amount of nitrogen generated, the short term nature of the blasting that would occur (1-2 days), and the rapid absorption of the chemical by plants in the stream. FWP anticipates that the potential for an algae bloom would be minimal, and if it occurred it would likely persist for only a short period of time.

Comment 2f: No contamination of groundwater is anticipated to result from this project. Rotenone binds readily to sediments, and is broken down by soil and in water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone moves only one inch in most soil types; the

only exception would be sandy soils where movement is about three inches (Hisata 2002). Studies in California where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994). Case studies in Montana have concluded that rotenone movement through groundwater does not occur. Tetrault Lake was sampled 2 and 4 weeks after applying 90 ppb rotenone to the lake. Neither rotenone nor inert ingredients were detected in a nearby domestic well, chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake. A Kalispell-area pond in 1998 was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no evidence of rotenone was detected. Another Kalispell-area pond was treated in 2001 with Prenfish 5% rotenone. Water from a well located 200 feet from that pond was tested 4 times over a 21 day period and showed no sign of contamination. FWP treated a small pond near Thompson Falls in 2005 with Prenfish to remove pumpkinseeds and bass. A well located 30 yards from the pond was tested and neither Prenfish nor inert ingredients were found in the well. A well at a Forest Service campground located 50 ft from a treated stream in Soda Butte Creek near Cooke City was tested immediately following and 10 months after treatment with Prenfish, and no traces of rotenone were found (Olsen 2006). We do not anticipate any contamination of ground water as a result of this project because rotenone is known to bind readily with stream and lake substrates.

Comment 2j: The CFT Legumine label states "….Do not use water treated with rotenone to irrigate crops or release within 1/2 mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond or reservoir…" There are no irrigation diversions located within the proposed treatment areas. Irrigation diversions are present on the mainstem of Doolittle Creek downstream the North Fork, but none within 1 mile of the confluence of the North Fork. Any rotenone treated waters would be fully neutralized before reaching these diversions.

Comment 2m: FWP would submit a Notice of Intent for the purpose of applying a pesticide to a stream from Montana DEQ under the Pesticide General Permit. A Section 318 permit for the temporary generation of turbidity during the construction of the fish barrier on Sixmile Creek would also be obtained.

Cumulative Impacts: The proposed action of piscicide treatment would have a short term impact on water quality (piscicides) in the North Fork of Doolittle Creek and Sixmile Creek. Because of the rapid breakdown rate of CFT Legumine and active neutralization at the fish barriers, these impacts would attenuate through time and would not impact long-term water quality or the productivity of fisheries resources after restocking. Barrier construction would have short term and minor impacts to water quality through the potential increase in nitrogen levels and small increases in turbidity. FWP does not expect the proposed actions to result in other actions that would create cumulative impacts to water resources in the proposed streams nor does FWP foresee any other activities in the basin that would add to impacts of the proposed action. As such, there are no cumulative impacts to water resources related to treatment of proposed streams with piscicides or the associated barrier construction.

3. AIR Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))			X			3a
b. Creation of objectionable odors?		X				3b
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				
e. Will the project result in any discharge which will conflict with federal or state air quality regs?		X				

Comment 3a: Emissions would be generated as a result of operating gasoline powered vehicles and equipment (gas powered rock drill) during barrier construction and fish removal. These impacts should be minor and temporary as barrier construction is anticipated to last only one to two days and fish removal is anticipated to last only two to three days in each stream.

Comment 3b: The advantage of CFT Legumine over other rotenone products is that it has less petroleum hydrocarbon solvents such as toluene, xylene, benzene, and naphthalene. By comparison, Prenfish has a strong chemical odor. CFT Legumine is virtually odor-free and performs almost identically to Prenfish.

Cumulative Impacts: Impacts to air quality from the proposed actions would be short term and minor. FWP does not expect the proposed action to result in other actions that would create cumulative impacts to air quality in the North Fork of Doolittle or Sixmile creeks nor do we foresee any other activities in the basin that would add to impacts of the proposed action. As such, there are no cumulative impacts to air quality related to treatment of the proposed streams with piscicides or associated barrier construction.

4. VEGETATION Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?			X			4a
b. Alteration of a plant community?		X				
c. Adverse effects on any unique, rare, threatened, or endangered species?		X				4c
d. Reduction in acreage or productivity of any agricultural land?		X				
e. Establishment or spread of noxious weeds?			X			4e
f. Will the project affect wetlands, or prime and unique farmland?		X				

Comment 4a: There would be some disturbance of vegetation along the stream during the proposed treatment due to increase foot traffic. These impacts should be minimal because all streams have existing trails (some primitive) or roads that provide good foot and/or vehicular access to the sites. FWP anticipates any impacts to plants resulting from trampling would be unnoticeable within one growing season. Rotenone does not affect plants at concentrations used to kill fish. Minor amounts of vegetation would also be disturbed during barrier construction, primarily to access the site and during blasting. There are a few alders and willows near the proposed barrier site that would likely be impacted by the blasting. Impacts would be mitigated by reclaiming the sites and reseeding disturbed soils with native grass seed mix. Vegetation disturbances are expected to be short term and minor.

Comment 4c: Sapphire rockcress, low spike-moss, Mulhick's buckwheat, storm saxifrage, Lemhi beardtongue, and Idaho sedge are listed as species of concern or potential species of concern that occur within the proposed project areas. No impacts to these species are anticipated as a result of the proposed action. All rotenone products, including CFT Legumine, have no impacts on aquatic or terrestrial plant species at fish killing concentrations. Some trampling is possible due to increase foot traffic along the proposed streams; however, these impacts should be minimal because all streams have existing trails or roads that provide good foot and/or vehicular access to the sites.

Comment 4e: Machinery and equipment used during the project may inadvertently carry noxious weeds to the project site. Proposed mitigation includes washing all equipment and vehicles before entry onto the project site and removal of mud, dirt, and plant parts from project equipment before moving into project area. Subsequent weed monitoring and removal may be performed if warranted.

Cumulative Impacts: Impacts to vegetation from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create

cumulative impacts to vegetation in the proposed WCT restoration streams. Vegetation could potentially suffer from increase trampling if the new fisheries were to attract more recreational use. We would conclude that it is very unlikely that the new WCT fisheries would attract significant interest and associated higher use levels, however, based on other similar WCT fisheries and their limited angling use. FWP does not foresee any other activities in the basins proposed for WCT restoration that would add to impacts of the proposed action. As such, there are no cumulative impacts to vegetation related to the proposed action.

5. FISH/WILDLIFE **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?			X		yes	5b
c. Changes in the diversity or abundance of nongame species?			X		yes	5c
d. Introduction of new species into an area?			X			
e. Creation of a barrier to the migration or movement of animals?			X		No	5e
f. Adverse effects on any unique, rare, threatened, or endangered species?			X			5f
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?			X			5g
h. Will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5f)			X		Yes	See 5f
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)			X			5i

Comment 5b: This project is designed to eradicate non-native brook trout (a game fish) in the North Fork of Doolittle Creek and Sixmile Creek upstream of established and proposed fish migration barriers. These impacts are minor and temporary, however, because the WCT (also a game fish) would be salvaged and/or restocked and would eventually repopulate the streams. There would, therefore, be no net loss of habitat occupied by self-sustaining populations of wild game fish. There would be no proposed changes in the fishing regulations as a result of this project; therefore, once WCT become established it will be catch and release only for cutthroat trout. It is possible that once WCT become established in the streams, they may be able to support some degree of angler harvest, but that determination will have to be made some time in

the future. Rotenone when applied at fish killing concentration has no impact on terrestrial wildlife including birds and mammals that consume dead fish or treated water.

Comment 5c: Non-game non-target species that could be impacted include some aquatic insects and potentially larval stages of amphibians. Columbia spotted frogs and western toads have been documented in the area and are potentially present at both streams. Metamorphosed amphibians that breathe air are not affected by rotenone at fish killing concentrations; however, non-metamorphosed tadpoles that respire through their skin and/or gills are affected. The timing of these projects should mitigate any impacts to spotted frogs and western toads because most would have metamorphosed by late summer when the rotenone treatments are proposed. Tailed frogs present in North Fork Doolittle and Sixmile creeks may be impacted by the use of CFT Legumine because juvenile life stages of these amphibians are present in streams for up to four years. These impacts would be mitigated by capturing tadpoles before the stream is treated with CFT Legumine and holding them in non-treated waters. After the treatment is complete (one-two days), the tadpoles would be released back to the stream. Similarly, mottled sculpin, which are present in the North Fork Doolittle Creek, would be captured and salvaged prior to treatment with CFT Legumine.

Aquatic Invertebrates:

Numerous studies indicate that rotenone has temporary or minimal effects on aquatic invertebrates. The most noted impacts are temporary and often substantial reduction in invertebrate abundance and diversity. In a study of the impacts of a rotenone treatment in Soda Butte Creek in south-central Montana, aquatic invertebrates of nearly all taxa declined dramatically immediately post rotenone treatment; however, only one year later nearly all taxa were fully recovered and at greater abundance than pre treatment (Olsen and Frazer 2006). One study reported that no long-term significant reduction in aquatic invertebrates was observed due to the effects of rotenone which was applied at levels twice as high as the levels proposed for this project (Houf and Campbell 1977). Chandler and Marking (1982) found that clams and snails were between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation). The reduction of aquatic invertebrates in all cases was temporary, and most treatments used a higher concentration of rotenone than proposed for these projects (Schnick 1974). In a study on the relative tolerance of different aquatic invertebrates to rotenone, Engstrom-Heg et al. (1978) reported that the long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of recolonization. Temporary changes in aquatic invertebrate community structure due to a rotenone treatment could be similar to what is observed after natural (e.g. fire) and anthropogenic (livestock grazing) disturbances (Wohl and Carline 1996; Mihuc and Minshall. 2005; Minshall 2003), though the physical impacts and resulting modifications of invertebrate assemblages after these types disturbances can last for a much longer period than a piscicide treatment.

Aquatic invertebrates are capable of rapid recovery from disturbance due to their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennack 1989), and generally high reproductive potential (Anderson and Wallace 1984), (Boulton et al. 1992; Matthaei et al. 1996). Headwater reaches and tributaries to the proposed WCT restoration streams that do not hold fish would not be treated with rotenone and would provide a source of aquatic invertebrate colonists

that could drift downstream. Recolonization would additionally include aerially dispersing invertebrates from downstream areas (e.g. mayflies, caddisflies, dipterans, stoneflies).

The possibility of eliminating a rare or endangered species of aquatic invertebrate in the proposed streams by treating with rotenone in the formulation of CFT Legumine is very unlikely. Montana Natural Heritage lists no species of concern or potential species of concern of aquatic invertebrates in either of the streams proposed for WCT restoration. Aquatic invertebrates have been routinely collected in SW Montana as part of separate MEPA processes, prior to WCT restoration projects in mountains streams (e.g., Eureka, Little Tepee, Little Tizer, Elkhorn, Crazy, Whitehorse, Soda Butte creeks). These collections in all cases have shown aquatic invertebrate assemblages typical of headwater streams in southwestern Montana, and in no cases have threatened or endangered species been discovered. FWP expects that the proposed streams contain the same type of aquatic invertebrate assemblages found in other nearby streams and the possibility of eliminating a rare or endangered species is minimal. Aquatic invertebrates would be collected from each stream prior to treatment with CFT Legumine and one year post treatment to monitor the recovery of aquatic invertebrate populations.

Based on these studies, FWP would expect the aquatic invertebrate species composition and abundance in the streams proposed for treatment with CFT Legumine to return to pre-treatment diversity and abundance within one to two years after treatment. The impacts to aquatic invertebrate communities, therefore, should be short-term and minor.

Birds and Mammals:

Mammals are generally not affected by rotenone at fish killing concentrations because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Studies of risk for terrestrial animals found that a 22 pound dog would have to drink 7,915 gallons of treated lake water within 24 hours, or eat 660,000 pounds of rotenone-killed fish, to receive a lethal dose (CDFG 1994). The State of Washington reported that a half pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume rotenone under field conditions is by drinking lake or stream water or consuming dead fish, a half pound animal would need to drink 16 gallons of water treated at 1 ppm to receive a lethal dose of rotenone.

The EPA (2007) made the following conclusion for small mammals and large mammals;

> *When estimating daily food intake, an intermediate-sized 350 g mammal will consume about 18.8 g of food. Using data previously cited from the common carp with a body weight of 88 grams, a small mammal would only consume 21% (18.8/88) of the total carp body mass. According to the data for common carp, total body residues of rotenone in carp amounted to 1.08 µg/g. A 350-g mammal consuming 18.8 grams represents an equivalent dose of 20.3 µg of rotenone; this value is well below the median lethal dose of rotenone (13,800 µg) for similarly sized mammals. When assessing a large mammal, 1000 g is considered to be a default body weight. A 1,000 g mammal will consume about 34 g of food. If the animal fed exclusively on carp killed by rotenone, the equivalent dose would be 34 g *1.08 µg/g or 37 µg of rotenone. This value is below the estimated median*

lethal equivalent concentration adjusted for body weight (30,400 µg). Although fish are often collected and buried to the extent possible following a rotenone treatment, even if fish were available for consumption by mammals scavenging along the shoreline for dead or dying fish, it is unlikely that piscivorous mammals will consume enough fish to result in observable acute toxicity.

Similar results determined that birds required levels of rotenone at least 1,000 to 10,000-times greater than is required for lethality in fish (Skaar 2001). Cutkomp (1943) reported that chickens, pheasants, and members of lower orders of *Galliformes* were quite resistant to rotenone, and four day old chicks were more resistant than adults. Ware (2002) reports that swine are uniquely sensitive to rotenone and it is slightly toxic to wildfowl, but to kill Japanese quail required 4,500 to 7,000 times more than is used to kill fish.

The EPA (2007) made the following conclusion for birds;

Since rotenone is applied directly to water, there is little likelihood that terrestrial forage items for birds will contain rotenone residues from this use. While it is possible that some piscivorous birds may feed opportunistically on dead or dying fish located on the surface of treated waters, protocols for piscicidal use typically recommend that dead fish be collected and buried, rendering the fish less available for consumption (see Section IV). In addition, many of the dead fish will sink and not be available for consumption by birds. However, whole body residues in fish killed with rotenone ranged from 0.22 µg/g in yellow perch (Perca flavescens) to 1.08 µg/g in common carp (Cyprinus carpio; Jarvinen and Ankley 1998). For a 68 g yellow perch and an 88 g carp, this represents totals of 15 µg and 95 µg rotenone per fish, respectively. Based on the avian subacute dietary LC_{50} of 4,110 mg/kg, a 1,000-g bird would have to consume 274,000 perch or 43,000 small carp. Thus, it is unlikely that piscivorous birds will consume enough fish to result in a lethal dose.

Amphibians and Reptiles:

Potential amphibians and reptiles found within the proposed treatment areas include: long-toed salamanders (*Ambystoma macrodactylum*), spotted frogs (*Rana pretiosa*), western toads *(Bufo boreas)* (amphibians), tailed frogs (*Ascaphus montanus*), western terrestrial garter (*Thamnophis elegans*), common garter (*T. sirtalis*), and rubber boa (*Charina bottae*) snakes (reptiles). Rotenone can be toxic to gill-breathing larval amphibians, though air breathing adults are less sensitive. Chandler and Marking (1982) found that Southern Leopard frog tadpoles were between three and ten times more tolerant than fish to Noxfish (5% rotenone formulation). Grisak et al. (2007) conducted laboratory studies on long-toed salamanders, Rocky Mountain tailed frogs (*Ascaphus truei*), and Columbia spotted frogs and concluded that the adults of these species would not suffer an acute response to Prenfish at trout killing concentrations (0.5-1 ppm) but the larvae would likely be affected. These authors recommended implementing rotenone treatments at times when the larvae are not present, such as the fall, to reduce the chance of exposure to rotenone treated water and potential impacts to larval amphibians. The proposed streams would be scheduled for treatment in August or September (prior to brook trout spawning), which would reduce but not eliminate potential impacts to larval amphibians. Any

reduction in amphibian abundance would be expected to be short term because of the low sensitivity of adults to rotenone, and because most larval amphibians, with the exception of tailed frogs, would have metamorphosed by August when the treatments are planned. Impacts to juvenile tailed frogs can be mitigated by capturing as many as possible and holding them in non-treated waters, then releasing them back to the streams once the treatment is complete. Further, adult frogs would not be affected by the stream treatment and could lay eggs in the stream the following year. A reduced abundance of aquatic invertebrates may temporally impact larval and adult amphibians that prey on these species, though the aquatic invertebrate community would recover rapidly. Reptiles (air-breathing) would not be directly impacted by rotenone treatment. Some snakes are known to consume fish from streams; therefore, there could be temporary reduction in available food as a result of the proposed piscicide treatments, but no reptiles present are known to be fish obligates.

Based on this information, FWP would expect the impacts to non-target organisms the streams proposed for WCT restoration to range from non-existent to short term and minor.

Comment 5e. One of the proposed actions is to construct a fish migration barrier in Sixmile Creek. This structure would preclude fish from migrating from lower Sixmile Creek to the upper reaches of the stream. However, the cascades present in the bedrock canyon appear to at least be a deterrent to fish passage for mottled sculpin which are abundant downstream and absent upstream of the canyon. Rainbow trout are also present downstream of the canyon (at low abundance), but absent upstream. The presence of a more definite fish barrier in Sixmile Creek should result in no additional impacts to fish distribution except for brook trout which would no longer have access to the upper reaches of the stream.

Comment 5f:

Terrestrial Organisms:

It is possible that osprey, eagles, or other birds would eat rotenone-killed fish. Bald eagles have been observed along the nearby Big Hole River. Conducting this project in the fall would not impact bald eagle nesting, and there would be no impacts to birds that consume rotenone-killed fish. See comment 5c for impacts to birds.

The project area is within potential grizzly bear habitat, but there are no known grizzly bears currently inhabiting the areas. This project should have little or no impact on grizzly bears because the bears are not dependent on fish for food. There would be no impact on grizzly bears that consume fish killed by rotenone or consume treated waters (see comment 5c for impacts to mammals). The project would not have an impact on grizzly bears other than potential short term displacement due to increased human presence along the streams.

The project sites are within the range of the gray wolf and lynx. Wolves and lynx are known to be present near the project areas. They may use these areas at times, but they are not dependant on fish from the stream as a food source. The impacts to these species may include temporary displacement during the treatment when personnel and equipment are present in the drainages. However, there should be no impacts from consuming treated waters or fish killed by rotenone

for the same reasons as previously noted. Impacts to lynx and wolves should therefore be minor and temporary. See comment 5c for impacts to mammals.

Wolverine, fisher, Hoary bat, Hoary marmot, Prebel's shrew, Wyoming ground squirrel, golden eagle, Clarks nutcracker, Brewer's Sparrow, black rosy-finch, and greater sage grouse are listed as species of special concern or potential species of concern present in the areas of the proposed action. None of these species should be substantially impacted by the restoration of WCT to the proposed streams. See comment 5g for minor potential impacts.

Aquatic organisms:

Westslope cutthroat trout, including some populations of slightly hybridized WCT, are considered a sensitive species and a species of special concern. The intent of the proposed project is to conserve and restore the existing WCT populations in the North Fork of Doolittle Creek. Because electrofishing is not 100% efficient at capturing fish, it is likely that not all WCT would be captured prior to introducing CFT Legumine to the North Fork of Doolittle Creek and Sixmile Creek, and it is possible that some WCT would be inadvertently killed. Similarly, mottled sculpin which are also present in the North Fork of Doolittle Creek would not likely be 100% salvaged. This impact is considered minor because it is anticipated that 90% or greater of the WCT and sculpin present would be captured prior to treatment and because these same fish would be restored to the stream once the project is complete. The expected outcome of the proposed projects, therefore, would be greatly beneficial to the long-term conservation of WCT.

Western Pearlshell mussels are also an aquatic species of concern that are known to occur in the vicinity of the proposed project areas. However, no pearlshell mussels have been found in the immediate project areas proposed for WCT restoration. If pearlshell mussels are encountered prior or during the treatment, they will be salvaged and held in non-treated waters and returned to the streams once the fish removal portion of the proposed project is complete. No other sensitive aquatic invertebrate species have been documented in the streams proposed for WCT restoration.

Comment 5g. There is the potential for displacement of some animals during the implementation of this project (see Comment 5f). Mule deer, elk, other big game species, and species mentioned above (Comment 5f) may be temporarily displaced as crews are present in the drainages performing the proposed work. However, these impacts should only be minor and temporary. The total treatment should be completed within two to three days in each stream. Barrier construction should also be completed within a one to two-day time window. Motorized and foot access is currently present throughout most of the drainages proposed for WCT restoration, and public access is present. Personnel presence would likely represent only a small and temporary increase in human activity.

Cumulative Impacts: Impacts to fish and wildlife from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create cumulative impacts to fish and wildlife resources within the proposed WCT restoration streams. Fish and wildlife resources could potentially suffer from the increased presence of

humans if the new fisheries attract more recreational use. However based on use patterns of other WCT fisheries, we would conclude that it is very unlikely that the new WCT fishery would attract significant interest and associated higher use levels. The current primarily brook trout fisheries would be replaced by WCT fisheries that occupy a similar niche and would provide similar ecological functions and provide for similar angling opportunities. FWP does not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to non-target organisms related to construction and the treatment of the proposed streams.

B. HUMAN ENVIRONMENT

6. NOISE/ELECTRICAL EFFECTS Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Increases in existing noise levels?			X		Yes	6a
b. Exposure of people to serve or nuisance noise levels?		X				
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				

Comment 6a: Noise levels would increase temporarily as 4x4 trucks and ATVs are used for the treatment. Explosions from blasting would create substantial but temporary noise during fish barrier construction in Sixmile Creek. These impacts should be minor and temporary as the construction of the barrier is scheduled to last only a few days, and the treatment phase of the project is scheduled to last only one to three days in each stream. There are no occupied structures within two miles of the proposed fish barrier in Sixmile Creek.

Cumulative Impacts: Increases in noise from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create increased noise in the streams or drainages proposed for WCT restoration. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to noise from the proposed treatment of the proposed streams with piscicides or associated barrier construction.

7. LAND USE Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of or interference with the productivity or profitability of the existing land use of an area?		X				
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		X				
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?			X			See 7c
d. Adverse effects on or relocation of residences?		X				

Comment 7c: During treatment with rotenone, public access to the project areas would be closed for several days to prevent public exposure to rotenone. The length of the closure would depend on the amount of time the treated streams remained toxic to fish but would not exceed five days. The label for CFT Legumine states that detoxification should be terminated when replenished fish survive and show no signs of stress for at least four hours. We expect the treated waters to be non-toxic to fish in 24-48 hours after the input of rotenone. It can reasonably be expected that any closures would last two to four days total. The treatment would be implemented in late summer (August-September). Stream water, at proposed treatment levels, would not be toxic to wildlife or livestock. The treatment would be coordinated such that livestock are pastured elsewhere or livestock would be temporarily moved to adjacent pastures during the treatment period if possible in order to limit any potential conflict.

Cumulative Impacts: Impacts on land use from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would impact land use in the proposed WCT restoration streams. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to land use from the proposed treatment of the proposed streams with piscicides or associated barrier construction.

8. RISK/HEALTH HAZARDS Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			X		YES	8a
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?			X		YES	8b
c. Creation of any human health hazard or potential hazard?			X		YES	see 8a,c
d. Will any chemical toxicants be used?			X		YES	see 8a

Comment 8a: The principal risk of human exposure to hazardous materials from this project would be limited to the applicators of the CFT Legumine. All applicators would wear safety equipment required by the product label and MSDS sheets. Such safety equipment may include respirator, goggles, rubber boots (waders), Tyvek overalls, and Nitrile gloves. All applicators would be trained on the safe handling and application of the piscicide. At least one Montana Department of Agriculture certified pesticide applicator would supervise and administer the project. Materials would be transported, handled, applied, and stored according to the label specifications to reduce the probability of human exposure or spill. See also Comment 8c for other review of risks to general public.

The use of explosives is planned for the construction of the Sixmile Creek barrier, but there is no risk of release of any toxic substances. There is some risk to the public as a result of the use of explosives; however, the nearest residence is more than 2 miles from the proposed barrier site. The Dry Creek Road crossing of Sixmile Creek and the Sixmile Creek Loop Road are approximately ½ mile from the proposed blast site. An individual will be stationed at the Dry Creek Road crossing of Sixmile Creek to keep members of the public from entering the project area during blasting.

Comment 8b: FWP requires a treatment plan for rotenone projects. This plan addresses many aspects of safety for people who are on the implementation team such as establishing a clear chain of command, training, delegation and assignment of responsibility, clear lines of communication between members, a spill contingency plan, first aid, emergency responder information, personal protective equipment, monitoring and quality control, among others. Implementing this project should not have any impact on existing emergency plans. The implementation plan developed by FWP should ensure that the risk of emergency response is minimal and any affects to existing emergency responders would be short term and minor.

Comment 8c: The EPA (2007) conducted an analysis of the human health risks for rotenone and concluded it has a high acute toxicity for both oral and inhalation routes but has a low acute toxicity for dermal route of exposure. It is not an eye or skin irritant nor a skin sensitizer. The

EPA could not provide a quantitative assessment of potentially critical effect on neurotoxicity risks to rotenone users, so a number of uncertainty factors were assigned to the rating values. An additional 10x database uncertainty factor, in addition to the inter-species (10x) uncertainty factor and intra-species (10x) uncertainty factor, has been applied to protect against potential human health effects and the target margin of exposure (MOE) is 1000. The following table summarizes the EPA toxicological endpoints of rotenone (from EPA 2007);

Exposure Scenario	**Dose Used in Risk Assessment, Uncertainty Factor (UF)**	**Level of Concern for Risk Assessment**	**Study and Toxicological Effects**
Acute Dietary (females 13-49)	NOAEL = 15 mg/kg/day UF = 1000 aRfD = 15 mg/kg/day = 0.015 mg/kg/day 1000	Acute PAD = 0.015 mg/kg/day	Developmental toxicity study in mouse (MRID 00141707, 00145049) LOAEL = 24 mg/kg/day based on increased resorptions
Acute Dietary (all populations)	An appropriate endpoint attributable to a single dose was not identified in the available studies, including the developmental toxicity studies.		
Chronic Dietary (all populations)	NOAEL = 0.375 mg/kg/day UF = 1000 cRfD = 0.375 mg/kg/day = 0.0004 mg/kg/day 1000	Chronic PAD = 0.0004 mg/kg/day	Chronic/oncogenicity study in rat (MRID 00156739, 41657101) LOAEL = 1.9 mg/kg/day based on decreased body weight and food consumption in both males and females
Incidental Oral Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day	Residential MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day [M/F] based on decreased parental (male and female) body weight and body weight gain
Dermal Short-, Intermediate-, and Long-Term	NOAEL = 0.5 mg/kg/day 10% dermal absorption factor	Residential MOE = 1000 Worker MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2.4/3.0 mg/kg/day
Inhalation Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0.5 mg/kg/day 100% inhalation absorption factor	Residential MOE = 1000 Worker MOE = 1000	[M/F] based on decreased parental (male and female) body weight and body weight gain
Cancer (oral, dermal, inhalation)	Classification; No evidence of carcinogenicity		

UF = uncertainty factor, NOAEL = no observed adverse effect level, LOAEL = lowest observed adverse effect level, aPAD = acute population adjusted dose, cPAD = chronic population adjusted does, RfD = reference dose, MOE = margin of exposure, NA = Not Applicable

Rotenolenoids are common degradation products found in the parent plant material used to make piscicidal forms of rotenone. The EPA (2007) concluded these degradation products are no more toxic than the active ingredient.

The EPA analysis of acute dietary risk for both food and drinking water concluded:

> *"…When rotenone is used in fish management applications, food exposure may occur when individuals catch and eat fish that either survived the treatment or were added to the water body (restocked) prior to complete degradation. Although exposure from this route is unlikely for the general U.S. population, some people might consume fish following a rotenone application. EPA used maximum residue values from a bioaccumulation study to estimate acute risk from consuming fish from treated water bodies. This estimate is considered conservative because the bioaccumulation study measured total residues in edible portions of fish including certain non-edible portions (skin, scales, and fins) where concentrations may be higher than edible portions (tissue) and the Agency assumed that 100% of fish consumption could come from rotenone exposed fish. In addition, fish are able to detect rotenone's presence in water and, when possible, attempt to avoid the chemical by moving from the treatment area. Thus, for partial kill uses, surviving fish are likely those that have intentionally minimized exposure.*
>
> *Acute exposure estimates for drinking water considered surface water only because rotenone is only applied directly to surface water and is not expected to reach groundwater. The estimated drinking water concentration (EDWC) used in dietary exposure estimates was 200 ppb, the solubility limit of rotenone. The drinking water risk assessment is conservative because it assumes water is consumed immediately after treatment with no degradation and no water treatment prior to consumption.*
>
> *Acute dietary exposure estimates result in dietary risk below the Agency's level of concern. Generally, EPA is concerned when risk estimates exceed 100% of the acute population adjusted dose (aPAD). The exposure for the "females 13-49 years old" subgroup (0.1117 mg/kg/day) utilized 74% of the aPAD (0.015 mg/kg/day) at the 95th percentile (see Table 5). It is appropriate to consider the 95th percentile because the analysis is deterministic and unrefined. Measures implemented as a result of this RED will further minimize potential dietary exposure (see Section IV)..."*

The EPA acknowledges the four principle reasons for concluding there is a low risk from exposure to rotenone treated water: first, the rapid natural degradation of rotenone, second, using active detoxification measures by applicators such as potassium permanganate, third, properly following piscicide labels and the extra precautions stated in this document and finally, proper signing, public notification or area closures which limit public exposure to rotenone treated water.

As for recreational exposure, the EPA concludes no risk to adults who enter treated water following the application by dermal and incidental ingestion, but requires a waiting period of three days after a treatment before toddlers swim in treated water. The aggregate risk to human health from food, water, and swimming does not exceed the EPA level of concern (EPA 2007).

Recreationists in the area would likely not be exposed to the treatments because treatment areas would be closed to public access. Signs would be in place to warn recreationists that the streams are being treated with rotenone and closed to entry. Proper warning through news releases, signing the project area, temporary road closure, and administrative personnel in the project area should be adequate to keep recreationists from being exposed to any treated waters.

Fisher (2007) conducted an analysis of the inert constituent ingredients found in the rotenone formulation of CFT Legumine for the California Department of Fish and Game. These inert ingredients are principally found in the emulsifying agent Fennodefo[99] which helps make the generally insoluble rotenone more soluble in water. The constituents were considered because of their known hazard status and not because of their concentrations in the Legumine formulation. Solvents such as xylene, trichloroethylene (TCE), and tetrachloroethylene are residue left over from the process of extracting rotenone from the root and can be found in some lots of Legumine. However, inconsistent detectability and low occurrence in other formulations that used the same extraction process were below the levels for human health and ecological risk. Solvents such as toluene, n-butylbenzene, 1,2,4 trimethylbenzene, and naphthalene are present in Legumine, and when used in other applications can be an inhalation risk. The human health risk is low, however, because of their low concentrations in this formulation. The remaining constituents, the fatty acid esters, resin acids, glycols, substituted benzenes, and 1-hexanol were likewise present but either analyzed, calculated, or estimated to be below the human health risk levels when used in a typical fish eradication project.

Methyl pyrrolidone is also found in Legumine. It is known to have good solvency properties and is used to dissolve a wide range of compounds including resins (rotenone). Analysis of Methyl pyrrolidone in Legumine showed it represents about nine percent of the formulation (Fisher 2007). The analysis concluded regarding the constituent ingredients in Legumine;

> "…None of the constituents identified are considered persistent in the environment nor will they bioaccumulate. The trace benzenes identified in the solvent mixture of CFT Legumine™ will exhibit limited volatility and will rapidly degrade through photolytic and biological degradation mechanisms. The PEGs are highly soluble, have very low volatility, and are rapidly biodegraded within a matter of days. The fatty acids in the fatty acid ester mixture (Fennodefo99™) do not exhibit significant volatility, are virtually insoluble, and are readily biodegraded, although likely over a slightly longer period of time than the PEGs in the mixture. None of the new compounds identified exhibit persistence or are known to bioaccumulate. Under conditions that would favor groundwater exchange the highly soluble PEGs could feasibly transmit to groundwater, but the concentrations in the reservoir, and the rapid biodegradation of these constituents makes this scenario extremely unlikely. Based upon a review of the physicalchemistry of the chemicals identified, we conclude that they are rapidly biodegraded, hydrolyzed and/or otherwise photolytically oxidized and that the chemicals pose no additional risk to human health or ecological receptors from those identified in the earlier analysis. None of the constituents identified appear to be at concentrations that suggest human health risks through water, or ingestion exposure scenarios and no relevant regulatory criteria are exceeded in estimated exposure concentrations…"

The Legumine MSDS states "…when working with an undiluted product in a confined space, use a non-powered air purifying respirator…and… air-purifying respirators do not protect workers in oxygen-deficient atmospheres…" It is not likely that workers would be handling Legumine in an oxygen deficient space during normal use. Proper ventilation and safety equipment would be used according to the label requirements to guard against this.

In their description of how South American Indians prepare and apply *Timbó*, a rotenone parent plant, Teixeira, et al. (1984) reported that the Indians extensively handled the plants during a mastication process, and then swam in lagoons to distribute the plant pulp. No harmful effects were reported. It is important to note that the primitive method of applying rotenone from root does not involve a calculated target concentration, metering devices, or involve human health risk precautions as those involved with fisheries management programs.

One study using rats injected with rotenone for a period of weeks reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). The relevance of the results to the use of rotenone as a piscicide have been challenged, however, based upon the following dissimilarities between the experimental methodology used and fisheries related applications: (1) the continuous intravenous injection method used to treat the rats leads to "continuously high levels of the compound in the blood," unlike field applications where 1) the oral route is the most likely method of exposure, 2) a much lower dose is used and 3) potential exposure to rotenone is limited to usually only a matter of days because of the rapid breakdown of the rotenone following application. Dimethyl sulfoxide (DMSO) additionally was used to enhance tissue penetration in the laboratory experiment (normal routes of exposure actually slow introduction of chemicals into the bloodstream); no such chemicals enhancing tissue penetration are present in the rotenone formulation proposed for use in this treatment. Similar studies (Marking 1988) have found no Parkinson-like results. Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982), or cancer (Marking 1988). Rotenone was found to have no direct role in fetal development of rats that were fed high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10-1,000 ppm rotenone over a 10 day period did not suffer any reproductive dysfunction. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppb and are far below that administered during most toxicology studies.

A recent study linked the use of rotenone and paraquat with the development of Parkinson's disease in humans later in life (Tanner et al. 2011). The after the fact study included mostly farmers from 2 states within the United States who presumably used rotenone for terrestrial application to crops and/or livestock. Rotenone is no longer approved for agricultural uses and is only approved for aquatic application as a piscicide. The results of epidemiological studies of pesticide exposure, such as this one, have been highly variable (Guenther et al. 2011). Studies have found no correlations between pesticide exposure and PD (e.g., Jiménez-Jiménez 1992; Hertzman 1994; Engel et al. 2001; Firestone et al. 2010), some have found correlations between pesticide exposure and PD (e.g., Hubble et al. 1993; Lai et al. 2002; Tanner et al. 2011), and some have found it difficult determine which pesticide or pesticide class is implicated if associations with PD occur (e.g., Engel et al. 2001; Tanner et al. 2009). Recent epidemiological studies linking pesticide exposure to PD have been criticized due to the high variation among study results, generic categorization of pesticide exposure scenarios, questionnaire subjectivity,

and the difficulty in evaluating the causal factors in the complex disease of PD which may have multiple causal factors (age, genetics, environment) (Raffaele et al. 2011). A specific concern is the inability to assess the degree of exposure to certain chemicals, including rotenone, particularly the concentration of the chemical, frequency of use, application (e.g., agricultural, insect removal from pets), and exposure routes (Raffaele et al. 2011). No information is given in the Tanner et al. (2011) study about the formulation of rotenone used (powder or liquid) or the frequency or dose farmers were exposed to during their careers. There is also no information given about the personal protective equipment used or any information about other pesticides farmers were exposed to during the period of the study. It is also unclear in the Tanner et al. (2011) study the frequency and the dose individuals were exposed to during the time period of use. Without information on how much rotenone individuals were exposed to and for how long, it is difficult to evaluate the potential risk to humans of developing Parkinson's disease from aquatic applications of rotenone products.

The State of Arizona conducted an exhaustive review of the human health of rotenone use as a piscicide (Guenther et al. 2011). They concluded: "To date, there are no published studies that conclusively link exposure to rotenone and the development of clinically diagnosed PD. Some correlation studies have found a higher incidence of PD with exposure to pesticides among other factors, and some have not. It is very important to note that in case-control correlation studies, causal relationships cannot be assumed and some associations identified in odds-ratio analyses may be chance associations. Only one study (Tanner et al. 2011) found an association between rotenone and paraquat use and PD in agricultural workers, primarily farmers. There are, however, substantial differences between the methods of application, formulation, and doses of rotenone used in agriculture and residential settings compared with aquatic use as a piscicide, and the agricultural workers interviewed were also exposed to many other pesticides during their careers. Through the EPA re-registration process of rotenone, occupational exposure risk is minimized by: new requirements that state handlers may only apply rotenone at less than the maximum treatment concentrations (200 ppb), the development of engineering controls to some of the rotenone dispensing equipment, and requiring handlers to wear specific PPE."

It is clear that to reduce or eliminate the risk to human health, including any potential risk of developing Parkinson's disease, public exposure to rotenone treated water must be eliminated to the extent possible. Areas treated with rotenone would be closed to public access during the treatment in order to reduce the potential for exposure of the public during the proposed use of CFT Legumine to restore WCT. Signs would be placed at access points informing the public of the closure and the presence rotenone treated waters. Personnel would be onsite to inform the public and escort them from the treatment area should they enter. Rotenone treated waters would be contained to the proposed treatment areas by adding potassium permanganate to the stream at the downstream end of the treatment reach (fish barrier). Potassium permanganate would neutralize any remaining rotenone before leaving the project area. The efficacy of the neutralization would be monitored using fish (the most sensitive species to the chemical) and a hand held chlorine meter. The potential for public exposure to rotenone treated waters is therefore very minimal. The potential for exposure would be greatest for those government workers applying the chemical. To reduce their exposure, all CFT Legumine label mandates for personal protective equipment would be adhered to (see Comment 8a).

Cumulative Impacts: Health hazards from the proposed action and the connected action of barrier construction would be short term and mitigated through closure of treatment areas to public and use of proper safety equipment, etc. Because rotenone in all formulations including CFT Legumine breaks down quickly and does not bioaccumulate, there should be no long-term or cumulative impacts of the application of the piscicide. FWP does not expect the proposed action to result in other actions that would increase the risk of health hazards in the streams proposed for WCT restoration. We do not foresee any other activities in the basin that would add to health impacts of the proposed action. As such there are no cumulative impacts related health hazards from the proposed treatments.

9. COMMUNITY IMPACT **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				
d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		X				

10. PUBLIC SERVICES/TAXES/UTILITIES **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Will the proposed action have an effect upon or result in a need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify: _____		X				
b. Will the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Will the proposed action result in a need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		X				
d. Will the proposed action result in increased used of any energy source?		X				
e. Define projected revenue sources		X				
f. Define projected maintenance costs		X				

11. AESTHETICS/RECREATION **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		X				
b. Alteration of the aesthetic character of a community or neighborhood?		X				
c. Alteration of the quality or quantity of recreational/tourism opportunities and settings? (Attach Tourism Report)			X			11c
d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				

Comment 11c: There would be a temporary loss of angling opportunity in North Fork Doolittle and Sixmile creeks for several years after treatment as the cutthroat trout repopulate the streams. Both streams are accessible to the public and lie on public lands administered by the Forest Service and FWP. However, once WCT are established and reproducing, they should provide the same angling opportunities as the prior brook trout fisheries. It should be noted that the proposed streams are small and do not likely receive much angling pressure. There are, as well, adjacent streams and areas downstream of fish barriers whose angling opportunities will not have changed as a result of the proposed action. The streams proposed for WCT restoration should be fully colonized with WCT within 5 years of project implementation and should provide the same angling opportunity to catch wild trout as pretreatment. Montana cutthroat trout fisheries in streams, for the most part, are catch and release only. FWP would evaluate whether the fishery could support harvest once it is colonized. Regulations would be changed, if necessary, to allow anglers the option of harvesting WCT for consumption from the proposed streams.

Cumulative Impacts: Impacts to recreation and aesthetics from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would impact recreation/aesthetics in the streams proposed for WCT restoration. We do not foresee any other activities in the basin that would add to impacts of the proposed action. As such, there are no cumulative impacts to recreation/aesthetics from the proposed action.

12. 12/HISTORICAL RESOURCES **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Destruction or alteration of any site, structure or object of prehistoric historic, or paleontological importance?		X				
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				
d. Will the project affect historic or cultural resources?		X				12d

Comment 12d. A cultural resources inventory was conducted on the Mount Haggin Wildlife Management area (Newell 1982), and no culturally significant structures or locations were identified in Sixmile Creek near the vicinity of the proposed fish barrier construction. Culturally significant areas are present near the confluence of Sixmile Creek and California Creek where the Mule Ranch is located approximately 1.5 miles downstream. There are not structures or evidence of mining that occurred at or near the proposed barrier site. It appears that the area was likely logged over 75 years ago.

13. SUMMARY EVALUATION OF SIGNIFICANCE Will the proposed action, considered as a whole:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources which create a significant effect when considered together or in total.)		X				
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		X				
e. Generate substantial debate or controversy about the nature of the impacts that would be created?			X		Yes	13e
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)			X			13f
g. List any federal or state permits required.						13g

Comments 13e and f: The use of piscicide has the potential to generate controversy. Public outreach and information programs can provide information regarding the use of pesticides. It is not known if this project would have organized opposition. Similar projects proposed and implemented in 2011 had some opposition, but they also had substantial support.

Comment 13g: The following permits would be required:

- MDEQ Pesticide General Permit
- USACE Section 404 Permit
- MDEQ 318 Permit from Montana DEQ for temporary exemption of water quality standards for the purpose of constructing the fish barrier

- 124 Permit from Montana Fish, Wildlife and Parks would be required for the construction of the fish barrier.

PART IV. OVERLAPPING AGENCY JURISDICTION

A. Name of Agency and Responsibility
   a. Montana Department of Environmental Quality – 318 Turbidity Permit, NDPES Discharge Permit for application of CFT Legumine.
   b. Montana Department of Fish, Wildlife & Parks - Montana Stream Protection Act (124 permit)
   c. US Army Corps of Engineers 404 permit for construction of Sixmile Creek fish barrier.
   d. Montana State Historic Preservation Office – Cultural and Historic Resources
   e. US Forest Service, Beaverhead-Deerlodge National Forest, Wisdom Ranger District for management of fish populations within wilderness and temporary closure of Forest Service roads during treatment.

PART V. AGENCIES THAT HAVE CONTRIBUTED OR BEEN CONTACTED

A. Name of Agency

   a. Montana Department of Environmental Quality.
   b. Montana Department of Fish, Wildlife & Parks – wildlife bureau
   c. US Army Corps of Engineers
   d. Montana Natural Heritage
   e. Montana State Historic Preservation Office
   f. US Forest Service, Beaverhead-Deerlodge National Forest, Wisdom Ranger District

PART VI. ENVIRONMENTAL IMPACT STATEMENT REQUIRED?

After considering the potential impacts of the proposed action and possible mitigation measures, FWP has determined that an Environmental Impact Statement is not warranted. The impacts of WCT restoration as described in this document are minor and/or temporary and mitigation for many of the impacts is possible. The primary negative impacts as a result of this project are temporary reductions in aquatic invertebrate abundance as a result of toxic effects of rotenone and impacts to tailed frog tadpoles in Six Mile Creek. Impacts to aquatic invertebrates have been shown to be short term (1-2 years) and minor and invertebrate communities are very resilient to disturbances such as treatment with rotenone. Mitigation measures such as salvage of tadpoles prior to treatment with rotenone and not treating sections of stream that do not contain fish but do contain tailed frog tadpoles should reduce the impacts to this non-target species. Further, the benefit to native WCT, a species in need of conservation, would balance the potential negative impacts to other species.

Prepared by : Jim Olsen, Fisheries Biologist_____ Date: 6/27/2012_____

Submit written comments to: Montana Fish, Wildlife & Parks
c/o Big Hole WCT Restoration EA comments
1820 Meadowlark Ln.
Butte, MT 59701

Or e-mailed to: jimolsen@mt.gov

Comment period is 30 days. Comments must be received by July 27, 2012.

PART V. REFERENCES

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